



909 Electric Ave., Suite 206
Seal Beach, CA 90740 USA
Phone: +1 562 493 0158
Fax: +1 562 493 3158
www.dtsweb.com

TDAS PLUS Level Trigger Device User's Manual



January 2006
Rev. 0

Table of Contents

DTS Support	3
Introducing the TDAS PLUS Level Trigger Device	4
Overview of TDAS PLUS Level Trigger Device Features	4
Control Panel	4
<i>Filter (Hz)</i>	4
<i>G Level</i>	5
<i>Arm Mode</i>	5
INTERFACE Connector	5
<i>Power Input</i>	5
<i>Event Outputs</i>	5
<i>External Arm Input</i>	5
<i>Accelerometer Data</i>	5
G SENSOR Connector	6
<i>External Accelerometer</i>	6
Basic Care and Handling	6
Shock Rating	6
<i>Mounting Considerations</i>	6
Thermal Considerations	7
Power Management	7
External Power Provisions	7
Power-up and Power-down Procedures	7
Communication Features	7
LED Indicators	7
Appendix A: Connector Information	9
Suggested Connector Sources	9
Appendix B: Mechanical Specifications	10
Appendix C: Accelerometer Specifications	11

DTS Support

TDAS systems are designed to be reliable and simple to operate. Should you need assistance, DTS has support engineers worldwide with extensive product knowledge and crash test experience to help via telephone, e-mail or on-site visits.

The best way to contact a DTS support engineer is to e-mail support@dtsweb.com. Your e-mail is immediately forwarded to all DTS support engineers worldwide and is typically the fastest way to get a response, particularly if you need assistance outside of normal business hours. For assistance by telephone, please go to <http://www.dtsweb.com/support.html> to find the phone number appropriate for your region of the world.

Introducing the TDAS PLUS Level Trigger Device

The TDAS PLUS Level Trigger Device (LTD) is a crashworthy device that provides an opto-isolated, contact-closure event output when a predetermined acceleration threshold is exceeded. The TDAS PLUS Level Trigger Device will initiate data collection or event trigger when used with TDAS PRO, TDAS G5, or TDAS PLUS equipment. The TDAS PLUS LTD can also be used with any other system or device capable of receiving a contact-closure event signal.

This manual discusses the features available with the TDAS PLUS Level Trigger Device. To identify the specific hardware included with your system, please see your packing list.

Overview of TDAS PLUS Level Trigger Device Features

- Built and tested for 100+ G dynamic testing environments.
- User-selectable filter values, G levels, and arm mode.
- Overvoltage protection, overcurrent protection, power input polarity protection and event overvoltage protection.
- User-replaceable external accelerometer in case of accidental damage.
- Use with any TDAS PRO rack, TDAS G5 Docking Station, TDAS PLUS Mini Distributor, fully-featured TDAS PLUS Distributor or any other device capable of receiving a contact-closure event signal.
- Operates on nominal 12 VDC power (11-15 volt range).
- Integral mounting flanges.

An interface cable appropriate for your application and feature set is typically provided with your unit. Please see your interface cable for the specific features included with your device.

Control Panel

The control panel on the TDAS PLUS LTD allows you to select the operational parameters for the unit. Keys to change switch position are supplied with the unit, however a simple flat-head screwdriver can also be used. The keys must be removed from the unit prior to performing a test.

Filter (Hz)

Five filter options are available: 50, 100, 200, 500, and 1000 Hz. Users should select the highest value appropriate for their application while keeping in mind that:

- The higher the value, the faster the response time,
- The lower the value, the less chance of a false trigger.

G Level

The unit has five user-selectable G levels: 0.5, 1.0, 2.0, 5.0, and 10.0 Gs. Users should select the level appropriate for their application.

Arm Mode

There are three positions for this switch: EXT (external), SAFE, and Gs. When EXT is selected, the event output signal is only enabled when the unit receives an external signal. When SAFE is selected, the event output signal is disabled. When Gs are selected, the unit is waiting to sense the acceleration threshold (G Level) before sending an event signal.

Arm Mode		
EXT (external)	SAFE	Gs
Enabled only when external signal is present	Disabled	Enabled

INTERFACE Connector

All functions, signals and power input are accessed via this connector. (See Appendix A for connector specifics and pin assignments.) An interface cable appropriate for your application and feature set is typically provided with your unit.

Power Input

The TDAS PLUS LTD does not contain an internal power source but has a dedicated connector on the interface cable for primary input power. An interface cable with the appropriate connector for your application is typically provided with your unit.

Event Outputs

Two opto-isolated, contact-closure event outputs are available via the INTERFACE connector. The first event output is always used with the G Level switch so that when the acceleration threshold is exceeded, a contact-closure event signal is sent to any attached equipment that can receive such a signal. The duration of the signal depends upon the length of time that the acceleration threshold is exceeded (i.e., as long as the T=0 LED is on). Depending on the requirements of your test environment, the second event output may also be included in the interface cable provided with your unit.

External Arm Input

An external arm input is available via the INTERFACE connector. Depending on the requirements of your test environment, this input may be included in the interface cable provided with your unit.

Accelerometer Data

Filtered and unfiltered accelerometer data are available for recording via the INTERFACE connector. (Filtered data is accomplished via a 2-pole Bessel filter.) Depending on the requirements of your test environment, one or both of these outputs may be included in the interface cable provided with your unit.

G SENSOR Connector

This connector is dedicated for use with the accelerometer provided with the unit. See Appendix A for connector specifics and pin assignments.

External Accelerometer

Should it be necessary, the external accelerometer can be replaced by the user. See Appendix C for accelerometer specifics and sourcing information.

Basic Care and Handling

The TDAS PLUS Level Trigger Device is a precision device designed to operate reliably in dynamic testing environments. Though resistant to many environmental conditions, care should be taken not to subject the unit to harsh chemicals, submerge it in water, or drop it onto any hard surface.

WARNING:

Electronic equipment dropped from desk height onto a solid floor may experience as much as 10,000 Gs. Under these conditions, damage to the exterior and/or interior of the unit is likely.

When transporting the unit, treat it as you might a laptop computer and you should have no problems. When not in use or if shipping is required, we suggest that you always place the unit in the padded carrying case originally provided with your system.

The TDAS PLUS LTD is not user-serviceable and should be returned to the factory for service or repair. The external accelerometer, however, can be purchased separately and replaced by the user. See Appendix C for accelerometer specifics and sourcing information.

Shock Rating

All crashworthy TDAS PLUS systems are rated for and fully tested to 100+ Gs, 12 msec duration, in all axes and can be mounted directly on a vehicle, sled or other dynamic testing device.

Mounting Considerations

The unit should be securely bolted to the vehicle, sled or other dynamic testing device to provide the best shock protection and facilitate proper grounding. Mounting methods and mounting bolt selection should be carefully calculated so as to withstand expected shock loading. (See Appendix B for the unit's mechanical specifications.)

The external accelerometer should be mounted on the test fixture in the sensitive axis as indicated on the accelerometer block.

Thermal Considerations

It is extremely unlikely that excessive heating will ever be an issue in real-world testing applications using the TDAS PLUS Level Trigger Device. Should you have any questions about its use in your environment, please contact DTS.

Power Management

A good power source is of paramount importance. Each TDAS PLUS Level Trigger Device should be powered from a fully-charged 12-volt battery or a high-quality power supply with a nominal output voltage of 12 volts (11-15 volt range) and a capacity of at least 50 mA. When assessing power requirements, please consider any voltage drops that may occur due to cables, connectors, power converters, etc.

External Power Provisions

The TDAS PLUS LTD does not contain an internal power source but has a dedicated connector on the interface cable for primary input power. The voltage required to power the unit can be supplied in two ways: 1) directly from a 12-volt battery (e.g., TDAS PLUS Crashworthy Battery), or 2) connecting the unit to a TDAS PLUS Distributor. An interface cable with the appropriate connector for your application is typically provided with your unit.

Power-up and Power-down Procedures

Whenever the unit is connected to sufficient power, it will power up. Whenever power is disconnected from the unit, it will power down. Power up and power down is immediate upon application or removal of the power source.

Communication Features

The TDAS PLUS Level Trigger Device communicates via two LED indicators. The device does not support direct PC communications.

LED Indicators

The TDAS PLUS LTD has two LED indicators that provide power and acceleration threshold (G Level) information.

LED Status	PWR (green LED)	T=0 (red LED)*
Off	No power, insufficient power, or external accelerometer is not connected	Acceleration threshold not reached
On	Power OK	Acceleration threshold reached or exceeded

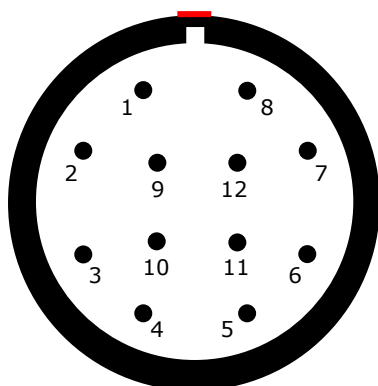
* Always enabled when unit is powered, regardless of Arm Mode (i.e., non-latching).

WARNING:

If the GREEN power LED on the TDAS PLUS Level Trigger Device goes dark unexpectedly during the performance of a test, the test should be aborted if this can be done in a safe manner.

Appendix A: Connector Information

12-pin INTERFACE connector (EGG.2B.312.CLL)

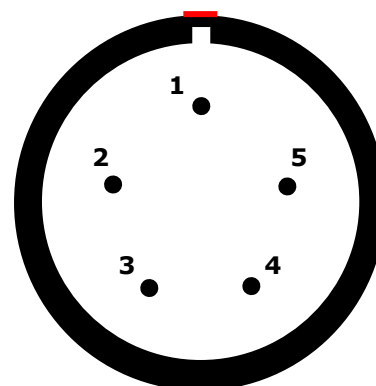


(panel view)

Suggested cable connector P/N:
FGG.2B.312.CLADxx

Pin	Function
1	+ Power in (11-15 VDC)
2	- Power in
3	+ Event out 1
4	- Event out 1
5	+ Event out 2
6	- Event out 2
7	External arm input (+5 VDC)
8	Common
9	+ Sensor output, unfiltered (100 mV/G)
10	+ Sensor output, filtered (100 mV/G)
11, 12	Reserved

5-pin G SENSOR connector (EGG.1B.305.CLL)



(panel view)

Suggested cable connector P/N:
FGG.1B.305.CLADxx

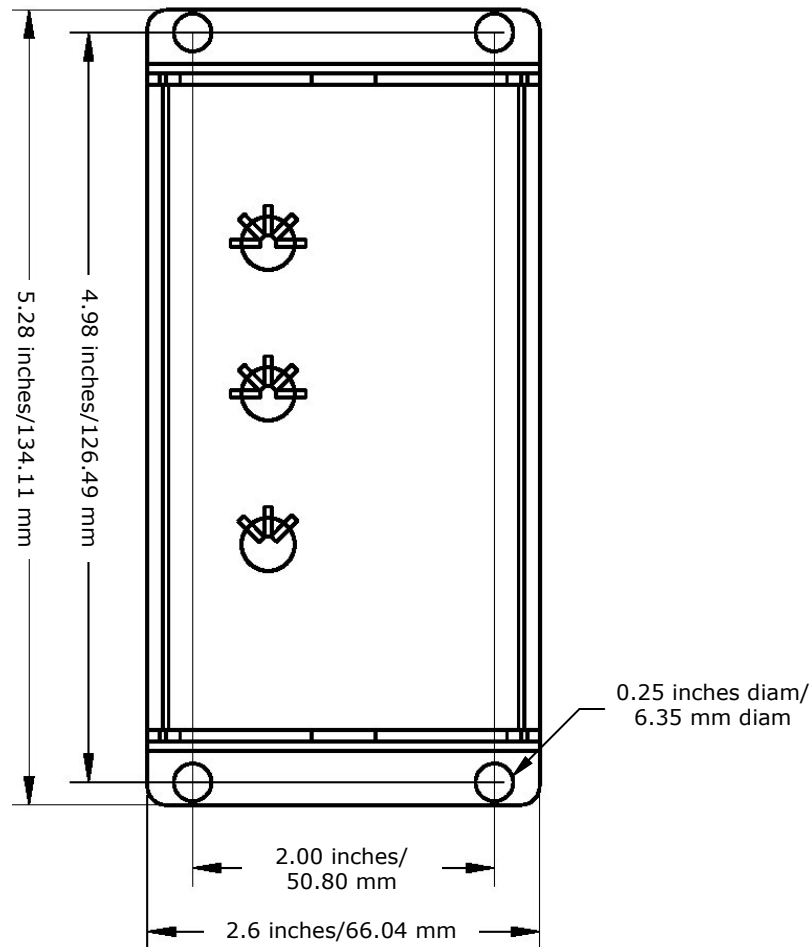
Pin	Function
1	- Power out (VDC)
2	Sensor reference (2.5 V)
3	+ Power out (VDC)
4	Sensor input (100 mV/G)
5	Shield (case)

Suggested Connector Sources

DTS uses LEMO connectors on the TDAS PLUS Level Trigger Device. If you need to purchase connectors, we suggest first going to LEMO directly (<http://www.lemo.com/index.html>). Their web site and worldwide sales team are very helpful. Should you have difficulty obtaining a specific part number, they can suggest connector variations or alternates and explain options that may be useful for your particular application. Another U.S. source is Alpine Electronics (www.alpine-electronics.com) in San Jose, California. They are a stocking distributor for LEMO and LEMO-compatible connectors.

Appendix B: Mechanical Specifications

Weight: 278 grams (without accelerometer assembly and cable)



Height: 1.71 inches / 43.43 mm

Model 4000 Accelerometer

Piezoresistive MEMS Accelerometer

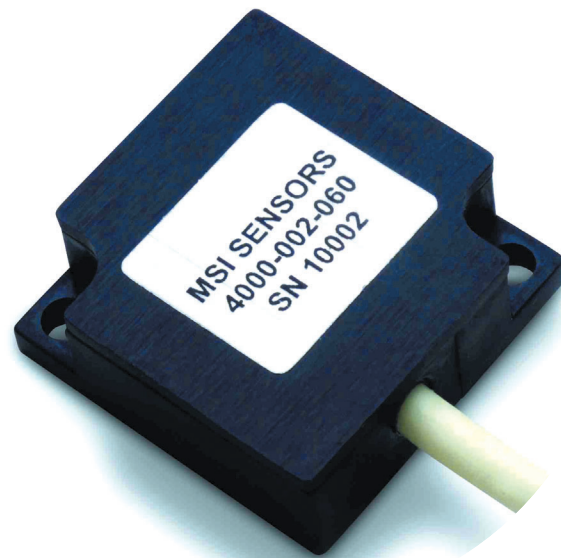
Signal Conditioned Output

Temperature Calibrated

Low Cost, Light Weight

DESCRIPTION

The Model 4000 is an economical signal conditioned accelerometer with integral temperature compensation. The accelerometer incorporates a 2nd generation piezoresistive MEMS sensor providing outstanding performance. The accelerometer is packaged in a light weight thermoplastic housing ideal for transportation and instrumentation testing. The signal conditioned output incorporates a 2.5V reference that offers the user a differential or single-ended output.



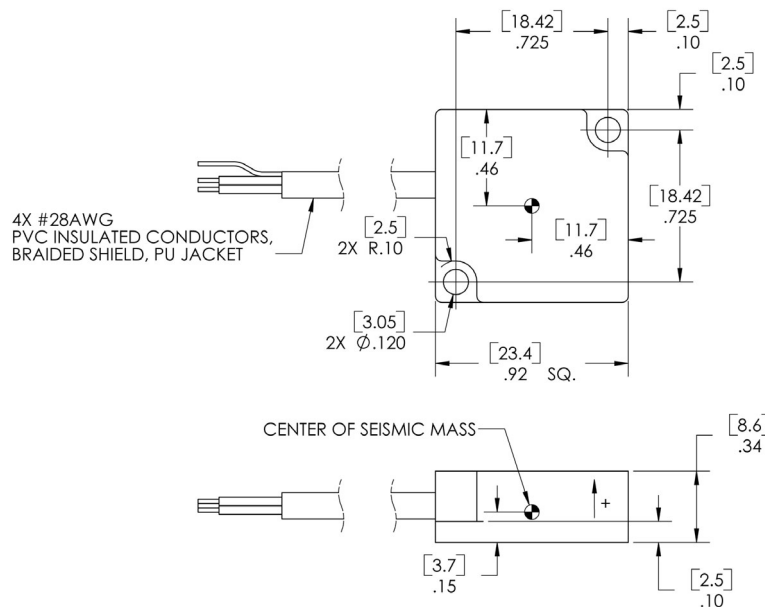
FEATURES

- ◆ $\pm 2g$ to $\pm 200g$ Dynamic Range
- ◆ High Over-Range Protection
- ◆ Signal Conditioned Output
- ◆ Low Power Consumption
- ◆ Light Weight Plastic Housing
- ◆ Gas Damping
- ◆ Integral Cable – Connector Options

APPLICATIONS

- ◆ Low Frequency Monitoring
- ◆ Transportation
- ◆ Vibration Sensing
- ◆ Test & Instrumentation

dimensions



Measurement Specialties, Inc.
1000 Lucas Way
Hampton, VA 23666 USA
www.meas-spec.com

Customer Service:
Tel: 1-757-766-1500 (Toll Free:
1-800-745-8008)
Fax: 1-757-766-4297

Vibration Sensors Technical
Support:
Tel: 1- 949-716-5377
Fax: 1- 949-916-5677
Email: vibration@meas-spec.com
RevA 1/19/06

measurement
SPECIALTIES

Model 4000 Accelerometer

performance specifications

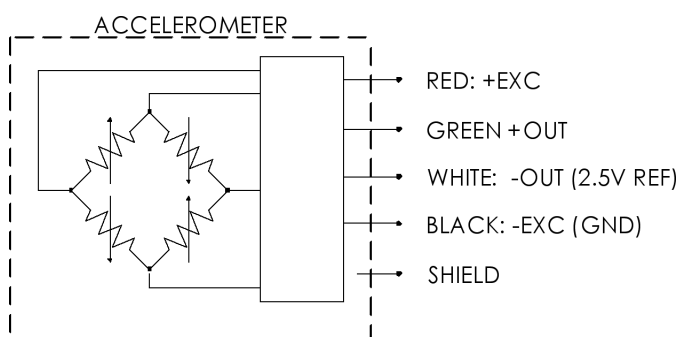
All values are typical at 25°C, 100Hz and 12Vdc excitation unless otherwise stated. Measurement Specialties reserves the right to update and change these specifications without notice.

Parameters

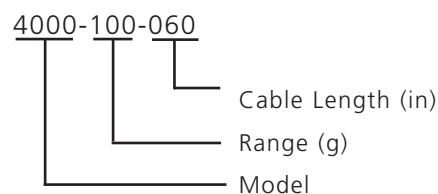
DYNAMIC						
Range	±2	±5	±10	±20	Units	Notes
Sensitivity	1000	400	200	100	mV/g	
Frequency Response	0-250	0-400	0-500	0-800	Hz	±5%
Range	±50	±100	±200		Units	Notes
Sensitivity	40	20	10		mV/g	
Frequency Response	0-1000	0-1500	0-1500		Hz	±5%
Non-Linearity			±1		% FSO	Maximum
Transverse Sensitivity (Max)			±3		%	±1% Typical
Zero Acceleration Output			2.50±.05		V	
Thermal Zero Shift (-20 to +85°C)			±.028		% FSO/°C	Maximum
Thermal Sensitivity Shift (-20 to +85°C)			±.028		%/°C	Maximum
ELECTRICAL						
Excitation Voltage			10 to 24		Vdc	
Excitation Current			5.0		mA	Typical
Reference Voltage			2.5		Vdc	
Output Impedance			100		Ω	Maximum
Insulation Resistance (@ 50Vdc)			100		MΩ	Minimum
Ground Isolation			Isolated			
PHYSICAL						
Housing			High Performance Thermoplastic			
Weight (cable not included)			8		grams	Maximum
Mounting			2x #4 or M3 Screws			3 lb-in mounting torque
ENVIRONMENTAL						
Shock Limit			5,000		g's	
Operating Temperature			-20 to +85		°C	
Humidity			Epoxy Sealed			

Contact factory for custom temperature compensation options.

electrical schematic



ordering information



Measurement Specialties, Inc.
1000 Lucas Way
Hampton, VA 23666 USA
www.meas-spec.com

Vibration Sensors Technical
Support:
Tel: 1- 949-716-5377
Fax: 1- 949-916-5677
Email: vibration@meas-spec.com

Customer Service:
Tel: 1-757-766-1500 (Toll Free:
1-800-745-8008)
Fax: 1-757-766-4297